

What is claimed:

Sub B27 1. A device that effects mitral valve annulus geometry of a heart, comprising:

5 a first anchor configured to be positioned within and anchored to the coronary sinus of the heart adjacent the mitral valve annulus within the heart;

a second anchor configured to be positioned within the heart proximal to the first anchor and adjacent the mitral valve annulus within the heart; and

10 a connecting member having a fixed length permanently attached to the first and second anchors, whereby

when the first and second anchors are within the heart with the first anchor anchored in the coronary sinus, the second anchor may be displaced proximally to effect the geometry of the mitral valve annulus and released to maintain the effect on the mitral valve geometry.

20 2. The device of claim 1 wherein the second anchor, when deployed, is configured to anchor against distal movement and moveable in a proximal direction.

25 3. The device of claim 2 wherein the first anchor is self-deploying upon release in the coronary sinus.,

4. The device of claim 2 wherein the second anchor is self-deploying upon release in the coronary sinus.

30 5. The device of claim 2 wherein the connecting member is a rigid member.

6. The device of claim 2 wherein the connecting member includes a spring having a maximum length.

7. The device of claim 2 wherein the connecting member is
5 flexible and nonstretchable.

8. A device for effecting mitral valve annulus geometry of a heart, comprising:

10 first anchor means for anchoring in the coronary sinus of the heart adjacent the mitral valve annulus;

second anchor means for being deployed within the heart proximal to the first anchor means and adjacent the mitral valve annulus; and

15 connecting means having a fixed length and permanently connecting the first anchor means to the second anchor means, whereby

20 when the first and second anchor means are within the heart with the first anchor means deployed, the second anchor means may be displaced proximally for cooperating with the first anchor means and the connecting means for effecting the geometry of the mitral valve annulus and released for maintaining the effect on the mitral valve geometry.

25 9. The device of claim 8 wherein the second anchor means, when deployed, anchors against distal movement and is moveable in a proximal direction.

30 10. The device of claim 8 wherein the first anchor means is self-deploying upon release in the coronary sinus.

11. The device of claim 8 wherein the second anchor means is self-deploying upon release in the coronary sinus.

12. The device of claim 8 wherein the connecting means is
5 a rigid member.

13. The device of claim 8 wherein the connecting means includes a spring having a maximum length.

10 14. The device of claim 8 wherein the connecting means is flexible and nonstretchable.

15 15. The device of claim 1 wherein the first anchor occupies less than all of the coronary sinus to permit a cardiac lead to be passed by the first anchor.

16. The device of claim 15 wherein the first anchor includes a loop through which the cardiac lead may be passed.

20 17. The device of claim 15 wherein the second anchor also occupies less than all of the coronary sinus to permit the cardiac lead to be passed by the second anchor.

25 18. The device of claim 17 wherein the second anchor includes a loop through which the cardiac lead may be passed.

19. A system that effects mitral valve annulus geometry of a heart, comprising:

30 a mitral valve device including a first anchor configured to be positioned within and anchored to the coronary sinus of the heart adjacent the mitral valve

annulus within the heart, a second anchor configured to be positioned within the heart proximal to the first anchor and adjacent the mitral valve annulus within the heart, and a connecting member having a fixed length permanently attached to the first and second anchors;

a catheter having a distal end, a proximal end and a lumen that receives the device, the catheter being guidable into the coronary sinus adjacent to the mitral valve annulus and deploying the first and second anchors of the device within the coronary sinus adjacent to the mitral valve annulus; and

a tether releasably coupled to the second anchor and extending proximally through the lumen and out of the catheter proximal end, whereby

when the first anchor is deployed by the catheter in the coronary sinus, the second anchor may be displaced proximally by proximally pulling on the tether to effect the geometry of the mitral valve annulus and thereafter released for deployment to maintain the effect on the mitral valve geometry.

20. The system of claim 19 wherein the second anchor, when deployed, is anchored against distal movement and moveable in a proximal direction.

21. The system of claim 19 wherein the first anchor is self-deploying upon release in the coronary sinus.

22. The system of claim 19 wherein the second anchor is self-deploying upon release in the coronary sinus.

23. The system of claim 19 wherein the connecting member is a rigid member.

24. The system of claim 19 wherein the connecting member
5 includes a spring having a maximum length.

25. The system of claim 19 wherein the connecting member is flexible and nonstretchable.

10 26. A method of effecting mitral valve annulus geometry in a heart, the method including the steps of:

fixing a first anchor within the coronary sinus of the heart adjacent to the mitral valve annulus;

15 positioning a second anchor within the heart proximal to the first anchor;

fixing a fixed length connecting member between the first anchor and the second anchor;

20 displacing the second anchor proximally to effect the geometry of the mitral valve annulus; and

releasing the second anchor from further proximal displacement to maintain the effect on the mitral valve geometry.

25 27. The method of claim 26 wherein the displacing step includes the steps of releasably coupling a tether to the second anchor and pulling proximally on the tether.

30 28. The method of claim 27 including the further step of removing the tether from the second anchor after the releasing step.

29. A method of effecting mitral valve geometry of a heart, the method including the steps of:

advancing a guide catheter into the coronary sinus of the heart adjacent to the mitral valve annulus;

5 feeding a self-deploying first anchor down and out of the guide catheter to deploy the first anchor in the coronary sinus adjacent to the mitral valve annulus;

connecting a fixed length connecting member between the first anchor and a self-deploying second anchor that once deployed anchors at least against distal movement;

10 guiding the second self-deploying anchor down the guide catheter to a position within the coronary sinus proximal to the first anchor;

15 displacing the second anchor proximally to effect the geometry of the mitral valve annulus;

withdrawing the guide catheter to release and deploy the second anchor; and

20 releasing the second anchor to deploy the second anchor and maintain the effect on the mitral valve annulus geometry.

30. The method of claim 29 including the further step of releasably coupling a tether to the second anchor prior to the displacing step.

25 31. The method of claim 30 wherein the displacing step includes the step of pulling proximally on the tether.

30 32. The method of claim 29 wherein the feeding step includes locating the first anchor proximally to the circumflex artery within the coronary sinus.

33. A device that effects mitral valve annulus geometry of a heart, comprising:

5 a first anchor configured to be positioned within and anchored to the coronary sinus of the heart adjacent the mitral valve annulus within the heart;

a second anchor configured to be positioned within the heart proximal to the first anchor and adjacent the mitral valve annulus within the heart; and

10 a connecting member attached between the first and second anchors,

at least one of the first and second anchors anchoring against movement in a first direction and being moveable in a second direction opposite the first direction.

15 34. The device of claim 33 wherein the at least one anchor is the first anchor wherein the first direction is a proximal direction and wherein the second direction is a distal direction.

20 35. The device of claim 33 wherein the at least one anchor is the second anchor wherein the first direction is a distal direction and wherein the second direction is a proximal direction.

25 36. The device of claim 33 wherein the first anchor anchors against movement in a proximal direction and is moveable in a distal direction and wherein the second anchor anchors against movement in the distal direction and is moveable in the
30 proximal direction.

37. A device that effects mitral valve annulus geometry of a heart, comprising:

a first anchor configured to be positioned within and anchored to the coronary sinus of the heart adjacent the mitral valve annulus within the heart;

a second anchor configured to be positioned within the heart proximal to the first anchor and adjacent the mitral valve annulus within the heart; and

a connecting member attached between the first and second anchors,

the first anchor being configured to occupy less than all of the coronary sinus to permit a cardiac lead to be passed by the first anchor.

38. The device of claim 37 wherein the first anchor includes a loop through which the cardiac lead may be passed.

39. The device of claim 37 wherein the second anchor is positionable within the coronary sinus and wherein the second anchor is configured to occupy less than all of the coronary sinus to permit the cardiac lead to be passed by the second anchor.

40. The device of claim 39 wherein the second anchor includes a loop through which the cardiac lead may be passed.

41. The device of claim 39 wherein each of the first and second anchors includes a loop through which the cardiac lead may be passed.

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